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MEMORANDUM FOR MILITARY AND INDUSTRY DISTRIBUTION 24 June 2004

SUBJECT: Initial Draft of MIL-PRF-29504/16, New Document Titled: Termini, Fiber Optic, Connector, Removable, Environment Resistant.
Project Number 6060-0155.

Attached subject document is being proposed. Please review this document and provide concurrence or comments to this office.

The initial draft of the new document was generated to establish the requirements for a termini for utilization in MIL-PRF-83526/16, /17 and /18 (proposed) connectors. The document can be viewed at the following web sites:

http://www.dscc.dla.mil/programs/milspec/
or
http://www.dscc.dla.mil/Programs/MilSpec/DocSearch.asp

If this document is of interest to you, please provide your comments and/or suggested changes via e-mail to eugene.ebert@dla.mil or by FAX to (614) 692-6939. You may also send comments using a Compilation of Comments Form 155 posted on the above web site.

Comments or suggested changes that are not editorial in nature should include justification. Industrial activities should indicate whether they are commenting from the standpoint of a "User" or "Manufacturer." Military review activities should forward comments to their custodians in sufficient time to allow for consolidating the departmental reply. All agencies, industry, and coordinated custodian comments should be sent to this center. Comments originating from the military departments must be identified as either "Essential" or "Suggested." Essential comments, which must be accepted or withdrawn, should be supported by test data unless they obviously require no data.

Please return comments to this Center no later than COB 18 August 2004. Any further coordination concerning this document will be circulated only to firms and organizations that furnish comments or reply that they have an interest.

Indicate below your interest and FAX or e-mail, to DSCC-VAT, DSN 850-6939 or commercial 614-692-6939, or e-mail comments to eugene.ebert@dla.mil.

_____ CONCUR _____ NO INTEREST _____ WILL REPLY BY DEADLINE

COMPANY NAME _____ POINT OF CONTACT _____

PHONE _____ E-MAIL _____

If there are any questions, please contact Gene Ebert, phone DSN 850-0729/commercial 614-692-0729, FAX DSN 850-6939/commercial 614-692-6939, DSCC-VAT, P.O. Box 3990, Columbus, OH 43216-5000.

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PERFORMANCE SPECIFICATION SHEET

TERMINI, FIBER OPTIC, CONNECTOR,
REMOVABLE, ENVIRONMENT RESISTING

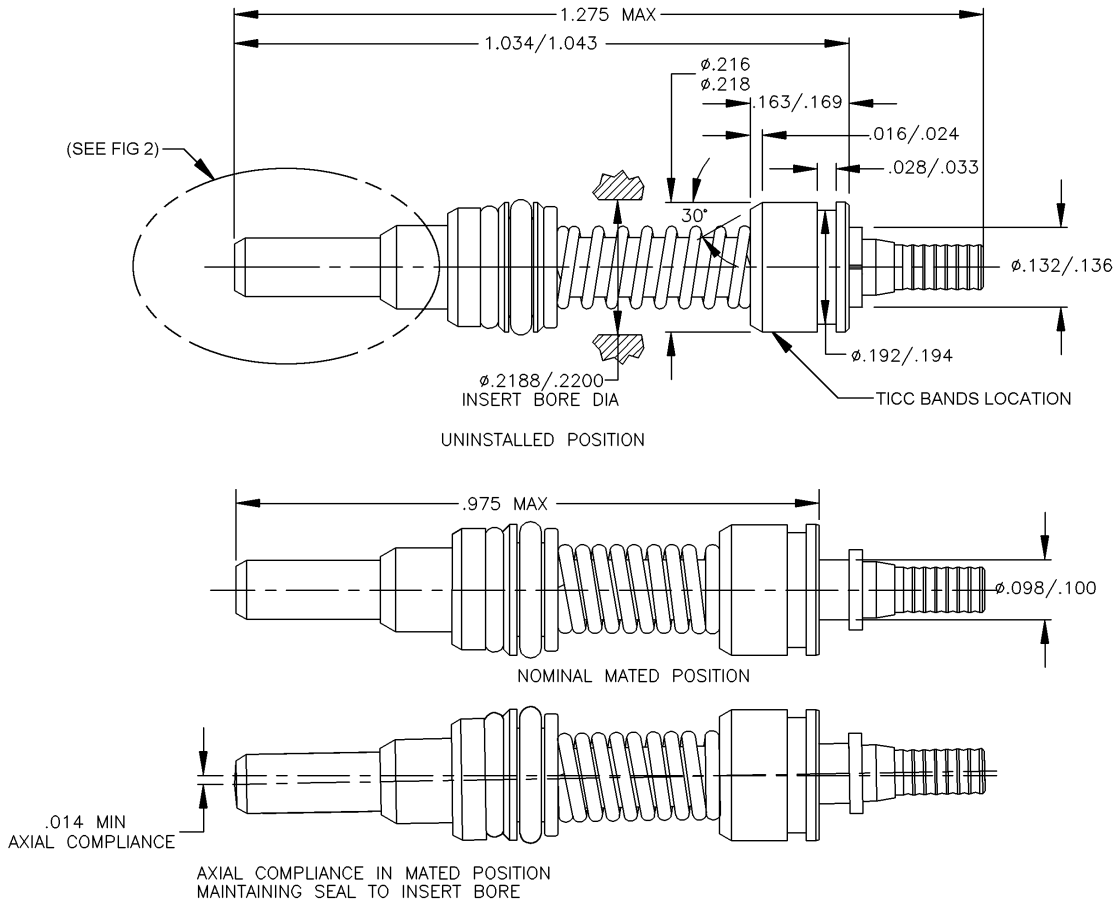


FIGURE 1. Termini dimensions.

Inches	mm	Inches	mm	Inches	mm
.014	.356	.132	3.353	.218	5.537
.016	.401	.136	3.454	.2188	5.5575
.024	.610	.163	4.140	.2200	5.5880
.028	.711	.169	4.293	.975	24.765
.033	.838	.192	4.877	1.034	26.264
.098	2.489	.194	4.928	1.043	26.492
.100	2.540	.216	5.486	1.275	32.385

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. All diameters are to be concentric within 0.002 inch (0.05 mm).
4. Dimensions apply to plated/finished parts.
5. The TICC bands shall be applied in the area specified.

FIGURE 1. Termini dimensions - Continued.

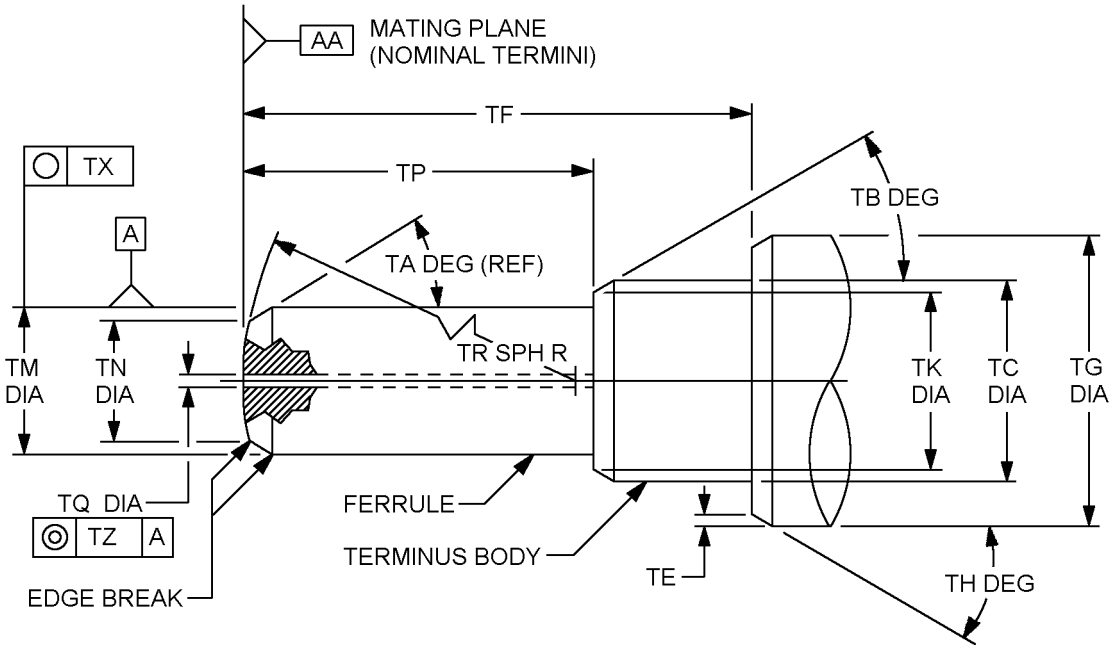
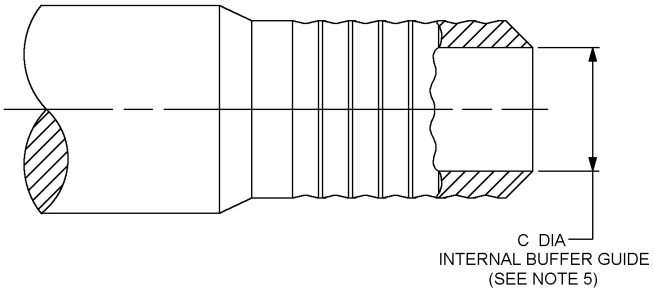


FIGURE 2. Termini interface dimensions.
See table I for dimensions

TABLE I. Termini interface dimensions.

Dimensional descriptions	Pinbody outside diameter		Pinbody outside chamfer depth		Pinbody outside chamfer angle		Pinbody front snout diameter		Pinbody front snout chamfer dia		Pinbody front snout chamfer angle		Ferrule extension length at centerline		Ferrule spherical radius	
Units	Inches (mm)		Inches (mm)		Degrees		Inches (mm)		Inches (mm)		Degrees		Inches (mm)		Inches (mm)	
Designator	TG		TE		TH		TC		TK		TB		TF		TR	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Multimode terminus	0.142 (3.607)	0.140 (3.556)	0.008 (.203)	0.005 (.127)	32°	28°	0.142 (3.607)	0.140 (3.556)	0.125 (3.175)	0.115 (2.921)	32°	28°	0.362 (9.194)	0.359 (9.119)	N/A	N/A
Single mode terminus																
APC single mode terminus																

Dimensional descriptions	Ferrule protrusion length at centerline		Ferrule outer diameter		Ferrule face diameter		Ferrule lead-in chamfer angle		Ferrule fiber bore diameter		APC ferrule angle		Ferrule O.D. out of roundness	Ferrule fiber bore to O.D. concentricity
Units	Inches (mm)		Inches (mm)		Inches (mm)		Degrees		Inches (mm)		Degrees		Inches (mm)	Inches (mm)
Designator	TP		TM		TN		TA		TQ		TS		TX	TZ
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Max
Multimode terminus	0.253 (6.426)	0.246 (6.248)	.09842 (2.5000)	.09835 (2.4980)	0.080 (2.032)	0.074 (1.880)	35°	25°	See TABLE III		N/A°	N/A	0.00003 (.000762)	See TABLE III
Single mode terminus			.09841 (2.4995)	.09836 (2.4985)									0.00002 (.000051)	



C Diameter (internal buffer guide)	
Inches	mm
.053	1.35
.056	1.42

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. C diameter to be concentric with .098/.100 dia. (see fig 1) within .002 (0.05 mm).
4. Dimensions shown after plating.
5. The "C" diameter of the internal buffer guide is used to center the optical waveguide fiber buffer.

FIGURE 3. Terminus internal buffer guide.

REQUIREMENTS:

Temperature: -28°C to +65°C operating, -40°C to +70°C non-operating, -40°C to + 70°C storage.

Design and construction:

Dimension and configuration: See figures 1, 2, and 3. Termini may have either flat or radiused end faces. Regardless of the end face geometry, the terminus shall meet the requirements of this specification when terminated using the procedures specified in MIL-STD-2024.

Weight: 1.0 grams maximum.

Adhesives: Use MIL-PRF-24792 or as approved by the qualifying activity. Use Hysol 1c, Epotek 330 or 353 series or equivalent as approved by the qualifying activity. Mixing and curing instructions shall be supplied with the assembly instructions provided with each terminus or applicable connector.

Material:

Termini body: Stainless alloy 303, Finish coating: Passivated in accordance with QQ-P-35C or equivalent. Marking: None on termini body.

Ferrule: Zirconia.

Termini spring: Stainless or corrosion resistant alloy. Finish: Passivated in accordance with QQ-P-35C or equivalent.

Retaining clip: Stainless Series 300 CRES finish: Passivated in accordance with QQ-P-35C or equivalent.

Termini seal: Nitrile shore 70.

Crimp sleeve: Stainless 300 series CRES Finish: Passivated in accordance with QQ-P-35C or equivalent.

Alignment sleeve: Zirconia.

Tools: See table II.

TABLE II. Tools.

Insertion and extraction tool	Polishing fixture tool
FSI P/N FSTF0645	FSI P/N FSTF1009

Termini:

a. All termini shall be identical.

b. Termini assemblies shall have a slight spring preload at rest (un-installed).

c. Termini assemblies shall be retained in a manner such that they are held captive to the insert and they are spring loaded against additional rearward movement.

d. When the insert cap is not installed, the termini shall be in the most forward “extended position”. The termini shall be compressed when the insert cap is installed and tightened thereby pushing the termini rearward to the “Ready to mate position”.

e. Termini shall have sufficient rearward axial displacement accommodation to be pushed further rearward by the mating terminus during connector mating. The termini axial movement shall come to rest when the two spring forces reach equilibrium. For identical spring forces the termini interface, datum AA (see figure 2) shall be coincident with the connector interface. For slightly different spring forces the termini interface will be skewed to one side. The axial accommodation shall allow all termini to be compressed at least 0.030 inches beyond the datum coincident with the connector interface without binding or bottoming out.

f. All termini assemblies shall be free to align coaxially with a mating terminus by locating their pivot location near the rear of the terminus with the front of the terminus free to move radially. The free movement of the front portion of the terminus shall allow the terminus to self align with the alignment sleeve upon engagement of one connector to another. The front seal on the terminus shall not inhibit the freedom of radial movement of the termini during mating or while in the mated position.

g. Termini length.

Uninstalled	1.034/1.043
Installed "ready-to-mate", pin position	.980/1.001
Installed "ready-to-mate" socket position	1.005/1.032
Mated position	.977 nominal
Fully compressed position	.872/.891

Termini body:

a. The terminus body shall have a provision for sealing the terminus to the insert in an area within 0.200 inches from the front face of the insert. This shall serve to seal the housing chamber from moisture migration into the connector housing area.

b. The terminus body shall have a front flange which, when engaged by the insert cap, positions the termini in the “Ready to mate” position.

c. The rear of the terminus body shall have a provision for a crimp sleeve for attaching the Kevlar strength member of the fiber element directly to the terminus body.

Ferrule (2.5 mm):

The ferrule shall be able to be freely inserted into the solid alignment sleeve of a mating connector without catching or binding and shall engage the mating termini face to face.

Termini spring:

Spring force: 3.49 lbs nominal in “Mated position” (see figure 1).

Termini seal:

a. The terminus seal shall seal the terminus to the insert and withstand 20 psi minimum.

b. The terminus seal shall not inhibit free axial movement of the termini assembly throughout the full range of its axial travel under any of the operating conditions

c. The terminus seal shall withstand the minimum sealing pressure during the full range of the axial and radial movement of the termini.

d. The seal shall not inhibit free radial movement of the termini assembly at any axial location within the full range of axial travel.

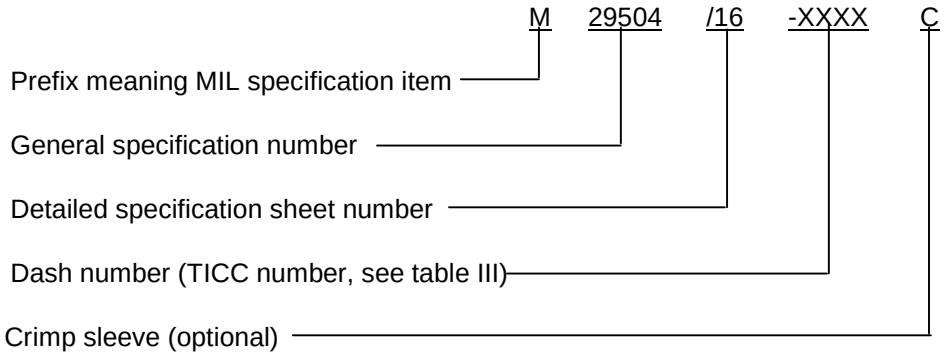
Crimp sleeve:

When specified, crimp sleeves shall be provided as a part of the termini assembly for attachment of the Kevlar strength member to the termini body. The crimp sleeves are not needed for buffered fiber attachment.

Mating termini: MIL-PRF-29504/16.

Circular runout: The circular runout of the ferrule bore (figure 2, TQ diameter) to the ferrule outer diameter (figure 2, TM diameter) shall be .039 (1.0 mm) maximum.

PIN construction:



Qualification:

To qualify or requalify termini to this specification sheet, all requirements of MIL-PRF-29504 shall be met using the qualifying terminus in a connector qualified to MIL-PRF-83526/16. Multimode termini shall be granted qualification upon the successful qualification of single mode termini.

Usage:

Termini compliant with this specification sheet may be used in connectors other than MIL-PRF-83526/16 at the discretion of the acquiring activity.

TICC number: See table III.

TABLE III. TICC numbers and dimensions.

TICC Number	Mode	TQ diameter 1/ (see figure 2)	
		Inches	mm
TBD	Single	0.00496 2/	.1260 2/
TBD	Multi	0.00500 2/	.1270 2/
TBD	Multi	0.00560 2/	.1420 2/
TBD	Multi	0.00905 3/	.2300 3/

1/ For maximum performance, termini should be selected for the best (tightest) fit to the fiber. Fitting the next size larger terminus to a fiber may affect connector performance.
2/ Tolerance +0.00004, -0.00000 (+.00010, -.0000 mm). Concentricity with ferrule OD, 0.00004 (.00010 mm) max.
3/ Tolerance +0.00016, -0.00000 (+.00040, -.0000 mm). Concentricity with ferrule OD, 0.00020 (.00050 mm) max.

Patent notice:

The Government does not have a royalty free license under the following patents for the benefit of manufacturers of the item, either for the Government or for use in equipment to be delivered to the Government.

Patent Numbers:	Patent Expiration Dates:
US 6,305,849	November 12, 2019
US 6,371,660	November 12, 2019
US 6,357,929	November 12, 2019

Custodians:
Army - CR
Navy - SH
Air Force - 11

Review activities:
Army - MI
Navy - AS, MC, OS, YD
Air Force - 13, 19, 80, 93

Civilian agencies:
DIA - DI
NASA - NA

Preparing activity:
Navy - SH

(Project: 6060-0155)

Agent:
DLA - CC